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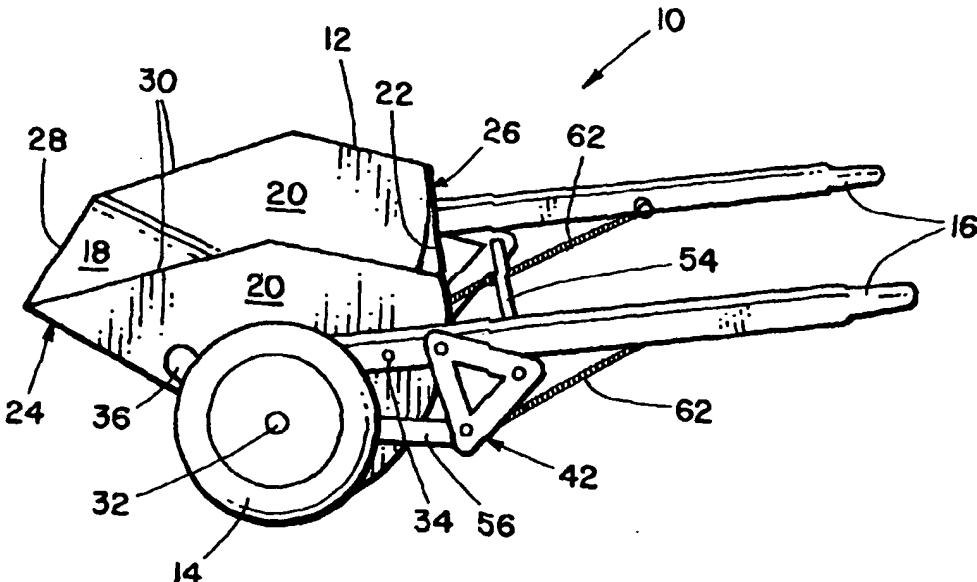
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[Continued on next page]

(54) Title: WHEELBARROW



(57) Abstract: A wheelbarrow (10) having a wheeled body (12) in the shape of a sloping shovel having two opposite side walls (20), a front loading end (24) and a rear receptacle end (26), a pair of laterally spaced and rearwardly extending handles (16) and a fulcrum mechanism (36) pivotally connected to the wheelbarrow (10) and moveable from a retracted position where the fulcrum mechanism (36) is clearing the ground and an operative position where the fulcrum mechanism (36) is in engagement with the ground and acting as a fulcrum while force is being applied to the handles (16) to swing the front loading end (24) of the body (12) to shovel up a load, with the fulcrum mechanism (36) assisting in the shovelling action by levering the sloping shovel end forwardly into a load of material.

WO 2005/014366 A1



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- *with amended claims*

WHEELBARROW

FIELD OF THE INVENTION

The present invention relates generally to wheelbarrows. In particular, the present
5 invention relates to a self-loading wheelbarrow designed to be operable by one operator.

BACKGROUND OF THE INVENTION

A traditional wheelbarrow comprises a tray, two wheels and two handles extending
10 rearwardly. It requires two operators to operate this kind of traditional wheelbarrow.
A first operator wheels an empty wheelbarrow to a loading area and holds the
wheelbarrow by the handles in a steady position while a second operator fills the tray
of the wheelbarrow with materials such as stones, sand, soil, or the like, by using a
shovel. After the tray is fully loaded, the first operator wheels the loaded
15 wheelbarrow to a dumping area to dump the load. This kind of wheelbarrow loading
operation, requiring two operators, is labour consuming and ineffective.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, there is provided a self-loading
20 wheelbarrow configured to be operable by one operator characterized by a body
having opposite sidewalls, a wheel system attached to said body for wheeling the
wheelbarrow, a front loading sloping end extending forwardly of the wheel system, a
rear receptacle end; a pair of laterally spaced handles attached to the body, and a
fulcrum mechanism pivotally connected to said wheelbarrow and moveable between
25 a retracted position where the fulcrum mechanism is clearing the ground to permit
wheeling of the wheelbarrow, and an operative position where the fulcrum
mechanism is in engagement with the ground below the wheel system and acts as a
fulcrum while force is being applied to the handles to swing the front loading sloping
shovel end of the body to shovel up a load from a pile of material.

30

According to another aspect of the present invention, there is provided a self-loading
wheelbarrow wherein the fulcrum mechanism is further characterised by a fulcrum
member pivotally connected to the body between the front loading sloping shovel
end thereof, and the rear end, a free end of said fulcrum member being configured to

engage to the ground at a level below the wheel system, a first link member pivotally connected to each side wall of the body adjacent the rear receptacle end thereof; a second link member pivotally connecting between the fulcrum member and the first link member, and a cross bar transversely extending behind the body and

- 5 underneatnthe handles, each end of the cross bar being secured to the first link member at each opposite side of the body, whereby pushing the cross bar towards the front loading end drives the fulcrum mechanism from the retracted position to the operative position.

- 10 According to yet another aspect of the present invention, there is provided a self-loading wheelbarrow further characterised by a spring that is operatively connected to said first link member. The springs provide the spring bias for the fulcrum mechanism. The springs also assist the operator in forcing the sloping shovel end forwardly into the pile of material for loading the material into the body.

- 15 According to a further aspect of the present invention, there is provided a self-loading wheelbarrow wherein each of the first link members are further characterised by a first portion pivotally connected to the second link member, a second portion pivotally connected to the body, and a third portion secured to the cross bar.

- 20 According to a further aspect of the present invention, there is provided a self-loading wheelbarrow wherein the fulcrum members are characterised by two legs, and a stop plate is provided on each fulcrum member at the free end thereof for limiting the penetration of the free end of each fulcrum member into the ground. The
25 stop plate is substantially perpendicular to a longitudinal axis of the fulcrum member. The free end of each fulcrum member is tapered.

- According to yet another aspect of the present invention, there is provided a self-loading wheelbarrow further characterised by the front loading sloping shovel end of
30 the body having a blade portion and wherein each opposite sidewall at the front loading end of the body has a height tapering towards the blade portion.

The various features of novelty which characterize the invention are pointed out with

a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be made to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

5

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a self-loading wheelbarrow in accordance with a preferred embodiment of the present invention;

FIG. 2 is an illustrative diagram showing a preferred embodiment of the wheelbarrow

10 in accordance with the present invention in a first position ready for loading, with the wheels still on the ground, and the legs retracted;

FIG. 3 is an illustrative diagram showing the wheelbarrow in a second, loading position, with the legs swung forward and extended and with the wheels raised above ground level; and

15 FIG. 4 is an illustrative diagram showing the wheelbarrow after being loaded, with the legs once more retracted and the wheels on the ground.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a perspective view of a self-loading wheelbarrow (10) illustrating a

20 preferred embodiment of the present invention.

Wheelbarrow (10) of the type having a body (12), a wheel system in this case being two wheels (14) rotatably mounted to the body (12), and two laterally spaced handles (16).

25

The body (12) is generally in the shape of a sloping shovel having a base (18), and two sidewalls (20) and (22). The body (12) has a front loading sloping shovel end (24) and a rear receptacle end (26). The front loading sloping shovel end (24) extends forwardly of the wheel system and enables load materials such as stones, sand, soil, or the like, to be loaded directly without shovelling. The rear receptacle end (26) is the end of the body (12) which prevents the loaded materials from sliding off the base (18).

The front loading end (24) has a sloping shovel blade portion (28) extending across substantially the width of the body (12). The front loading sloping shovel end of the body (12) has tapered sidewalls (30) tapering towards the blade portion (28).

- 5 The two wheels (14) are rotatably mounted on opposite sidewalls (20) of the body (12) respectively. Each of the two wheels (14) is rotatably mounted, such as, on an axle (32). The axle is located rearwardly of the sloping shovel end of the body so as to permit material to be shovelled up from a pile directly into the body as described below. This feature also ensures that the weight of the load will be carried principally
- 10 on the wheels, with only a little weight on the hands and arms of the operator.

The two laterally spaced handles (16) extend rearwardly and are fixedly attached to the body (12) respectively. In the preferred embodiment, the handles (16) are fixedly attached to the opposite sidewalls (20) of the body (12) respectively. Each

- 15 handle(16) is fastened to each sidewall (20) of the body (12) by fastening means (34) such as bolts and nuts.

A movable fulcrum leg member (36) is pivotally connected to each opposite sidewall (20) of the body (12) at the front loading end thereof by means of pivot pins (37).

- 20 The free end of each fulcrum leg member (36) is provided with a tapered end (38). This tapered end (38) is configured to anchor into sand or soil on the ground. A stop plate (40) is provided at the free end of the fulcrum leg member (36) above the tapered end (38) in order to limit the penetration of the fulcrum leg member (36) into the ground.

- 25 Two first link members (42) is pivotally connected to each opposite sidewall (20) of the body at the rear receptacle end thereof. In accordance with a preferred embodiment of the present invention, the first link member (42) takes the form of a triangular plate (44). Each triangular plate (44) has a first corner (46), a second corner (48), and a third corner (50). The first corner (46) of each triangular plate (44) is pivotally connected to the body (12) by means of a pivot pin (52). A cross bar (54) transversely extends behind the body (12) with both ends each being secured to the second corner (48) of the respective triangular plates (44). The third corner (50) of
- 30

second link member (56) by means of a pivot pin (58). The other end of the second link member (56) is pivotally connected towards the free end of a respective fulcrum leg member (36) by means of a pivot pin (60).

- 5 The fulcrum leg members (36), the first and second link members (42), (56), and the cross bar (54) together form a fulcrum mechanism.

A spring (62) extends from the first link member (42) to the handle (16) on each side of the body (12). The springs (62) are employed to bias the fulcrum mechanism to a

- 10 retracted position where the fulcrum members (36) are out of contact from the ground, (Figs 2 and 4).

The body 12 and the fulcrum mechanism (36), (42), (54), (56) are preferably made of metal, such as steel, or any other suitable materials.

15

FIGS. 2, 3 and 4 show the operation of the self-loading wheelbarrow (10) of the present invention.

An operator holds the handles (16) by his hands and wheels the wheelbarrow (10)

- 20 between a loading area and a dumping area. In this condition, as shown in FIG. 1, the wheels (14) engage the ground while the body (12) and the fulcrum leg members (36) are retracted and are not engaging the ground.

In order to shovel up a load from the loading area, an operator first wheels the

- 25 wheelbarrow (10) towards a pile of material in the loading area. The operator then tilts the wheelbarrow (10) forwardly (Fig 2) by lifting up the two handles (16) so that the handles (16) are at an approximately 11 o'clock position and the wheels (14) are lifted off the ground, as shown in Fig 2. In this position, the blade portion (28) of the front loading sloping shovel end (24) of the body (12) is angled downwardly, and the 30 sloping shovel end (24) can begin to sink into the pile of material to be loaded. The operator then swings the handles further upward to approximately an 11 o'clock position (Fig 3). With his foot he then pushes the cross bar (54) generally downwards towards the front loading end (24). This pushes the two fulcrum leg members (36) forwards and downwards into the ground. The fulcrum leg members

(36) advance forwards and downwards until the tapered ends (38) sink completely into the ground and further sinking is restricted by the stop plates (40). The fulcrum leg members (36) are now in a ground-engaging position (Fig 3).

- 5 With the foot still pressing on the cross bar (54) and the fulcrum leg members (36) still engaging the ground and acting as fulcrums, the operator starts pulling the handles (16) backwards and downwards. This swings the body (12) downwards and at the same time levers it forwards so that the front loading end (24) advances further, deep into the pile of material, as shown in FIG. 3.

10

With the fulcrum leg members (36) still engaging the ground and acting as fulcrums, the operator continues to exert downward force to the handles (16). This causes the sloping shovel to advance further forwardly into the material due to leverage from the fulcrum leg members.

15

In order to start levering and shovelling up the load the operator then swings the handles back down towards himself. This forces the sloping shovel end of the body to shovel up a load of material. This shovelling action is assisted by the action of the fulcrums leg members (36). Because they are firmly anchored in the ground, the

- 20 rearward swinging of the handles will tend to force the sloping shovel end forwardly into the material. This action is assisted by the springs which tend to want to swing the fulcrum leg members rearwardly. However since the free ends of the fulcrum leg members are anchored in the ground, the levering effect forces the sloping shovel end further into the material, and assists in loading the material. Consequently the
25 springs tend to force the body forwardly and thus assist in shovelling up a larger load of material.

When the handles (16) are lowered to a position where the wheels (14) start to touch the ground, the operator begins to lift his foot off the cross bar (54). When the foot is

- 30 lifted off the cross bar (54), the fulcrum mechanism (36), (42), (56) swings back to its retracted position under the influence of the biasing springs until the cross bar (54) hits the handles (16).

When the handles (16) are further lowered to an approximately horizontal position, as shown in FIG. 4, the load slides backwards from the front loading end (24) to the

rear receptacle end (26) of the body (12) by means of gravity. This sliding of the load from the front loading end (24) to the rear receptacle end (26) of the body (12) can be facilitated by shaking the body (12).

- 5 The above loading steps are repeated to obtain a full load in the body (12). Depending on the kind of material to be loaded, the wheelbarrow may be fully loaded after one shovelling operation.

Although it has been described that the fulcrum mechanism is spring-biased to the
10 retracted position by means of springs, it is appreciated that the fulcrum mechanism can be retained in the retracted position by other devices such as friction clips or counterweights.

With the fulcrum mechanism retained or biased in the retracted position, the
15 wheelbarrow of the present invention can be used as a conventional wheelbarrow or a wheeled shovelling device. Wheeling of the loaded wheelbarrow requires much less effort than the conventional wheelbarrow, because the weight of the load is carried over the wheels. The weight is not carried on the arms of the operator, to any significant extent.

20 The present invention utilizes certain principles and/or concepts as are set forth in the claims appended to this specification. Those skilled in the arts will realize that these principles and/or concepts are capable of being utilized in a variety of embodiments which may differ from the present embodiment utilized for illustrative
25 purposes herein. For this reason, the present invention is not to be construed as being limited solely to the illustrative embodiment, but should only be construed in view of the claims.

CLAIMS

1. A wheelbarrow (10) of the type having a body portion (12) for carrying a load, wheels (14) and handles (16) for pushing said body portion, said body portion being generally in the shape of a sloping shovel having two opposite side walls (20), a front loading end (24) and a rear receptacle end (26), and characterised by:
 - 5 a fulcrum mechanism (36), (42), (54), (56) pivotally connected to said body and said handles and moveable from a retracted position where said fulcrum mechanism is clearing the ground and an operative position where said fulcrum mechanism is in engagement with the ground and acting as a fulcrum, whereby when force is applied to the handles (16) to swing said front loading end (24) of said body (12) to shovel up a load, the fulcrum mechanism cooperates to assist in levering up a load of material.
 - 10
- 15 2. A wheelbarrow (10) as claimed in claim 1, further characterised by:
 - a fulcrum leg member (36) pivotally connected to each side of said body (12) at the front loading end thereof, a free end (38) of said fulcrum leg member being configured to engage the ground;
 - a first link member (42) pivotally connected to each side of said body (12) at the rear receptacle end thereof;
 - 20 a second link member (56) pivotally connecting between said fulcrum leg member (36) and said first link member (42); and
 - a cross bar (54) transversely extending behind said body (12) and underneath said handles (16), each end of said cross bar (54) being secured to said first link member (42) at each opposite side of said body (12);
 - ?5 whereby pushing said cross bar (54) towards the front loading end (24) drives said fulcrum mechanism (36) from said retracted position to said operative position.
3. A wheelbarrow (10) as claimed in claim 2, further characterised by a spring (62) is operatively arranged between each handle (16) and each pivotally connecting first link member (42), said springs providing the spring bias for said fulcrum mechanism.
- 10
4. A wheelbarrow (10) as claimed in claim 2, further characterised by each of said first link members (42) comprises a first portion (50) pivotally connected to said

second link member (56), a second portion pivotally connected to said handle, and a third portion (48) secured to said cross bar.

5. A wheelbarrow (10) as claimed in claim 2, further characterised by a stop plate (40) is provided on each fulcrum leg member (36) at the free end thereof for limiting the penetration of the free end of each fulcrum leg member into the ground, said stop plate (40) being substantially perpendicular to a longitudinal axis of said fulcrum leg member.
- 10 6. A wheelbarrow (10) as claimed in claim 2, further characterised by the free end (38) of each fulcrum leg member (36) is tapered.
7. A wheelbarrow as claimed in claim 2, further characterised by the front loading end (24) of said body comprises a blade portion (28).
- 15 8. A wheelbarrow (10) as claimed in claim 7, further characterised by each opposite sidewall (20) at the front loading end (24) of said body has a height tapering (30) towards said blade portion.
- 20 9. A wheelbarrow (10) as claimed in claim 1, further characterised by said pair of laterally spaced handles (16) are fixedly attached to the opposite side walls (20) of said body respectively.
- 25 10. A wheelbarrow (10) as claimed in claim 1, further characterised by said wheelbarrow comprises two wheels (14) each being rotatably mounted on an axle (32) on each side wall of said body (12), said wheels (14) being mounted intermediate said sloping shovel end (24) and said rear end (26) of said body.
- 30 11. A wheelbarrow (10) as claimed in claim 2, further characterised by said first link member (42) is triangular (42) in shape.
12. A self-loading type wheelbarrow configured to be operable by one operator of the type having a body portion (12) for carrying a load, wheels (14) and handles (16) for pushing said body portion, said body portion (12) being generally in the shape of

a sloping shovel having two opposite side walls (20), a front loading end (24) and a rear receptacle end (26), and characterised by:

a fulcrum mechanism (36), (42), (54), (56) pivotally connected to said wheelbarrow and moveable from a retracted position where said fulcrum mechanism is

5 clearing the ground and an operative position where said fulcrum mechanism is in engagement with the ground and acting as a fulcrum while force is being applied to the handles to swing said front loading end of said body to shovel up a load; wherein said fulcrum mechanism comprises:

a fulcrum leg member (36) pivotally connected to each side wall (20) of said body

10 (12) at the front loading end thereof, a free end (38) of said fulcrum leg member being configured to engage to the ground;

a first link member (42) pivotally connected at the rear receptacle end of said body;

a second link member pivotally connecting between said fulcrum leg member (36) and said first link member (42); and

15 a cross bar (54) transversely extending behind said body and underneath said handles (16), each end of said cross bar being secured to said first link member (36) at each opposite side of said body;

whereby pushing said cross bar (54) towards the front loading end by a foot of the operator drives said fulcrum mechanism (36) from said retracted position to said

20 operative position.

13. A self-loading type wheelbarrow as claimed in claim 12, further characterised by a spring (62) is operatively arranged between each handle and each pivotally connecting first link member (42), said springs providing the spring (62) bias for said

25 fulcrum mechanism.

14. A self-loading type wheelbarrow as claimed in claim 12, further characterised by each of said first link members (42) comprises a first portion (50) pivotally connected to said second link member (56), a second portion (52) pivotally connected to said

30 body, and a third portion (48) secured to said cross bar.

15. A self-loading type wheelbarrow as claimed in claim 12, further characterised by a stop plate (40) is provided on each fulcrum leg member (36) at the free end (38) thereof for limiting the penetration of the free end of each fulcrum leg member into

the ground, said stop plate being substantially perpendicular to a longitudinal axis of said fulcrum leg member.

16. A self loading type wheelbarrow as claimed in claim 12 further characterised by said springs (62) urge said fulcrum leg members (36) into a rearward position, and thus assist in forcing the sloping shovel body (24) forwardly into a load.

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original claims 1-16 replaced by amended claims 1-16 (4 pages)]

1. A wheelbarrow (10) of the type having a body portion (12) for carrying a load, wheels (14) and handles (16) for pushing the body and characterised by;
a wheeled body (12), said body being generally in the shape of a sloping shovel having two opposite side walls (20), a front loading end (24) and a rear receptacle end (26);
a pair of fulcrum leg members (36) pivotally connected to respective sides of said body (12) at the front loading end thereof, a free end (38) of each said fulcrum leg member being configured to engage the ground;
a pair of first link members (42) pivotally connected to each side of said body (12) at the rear receptacle end thereof, and connecting with said fulcrum leg members; said fulcrum leg members being moveable from a retracted position where said fulcrum leg members are clearing the ground and an operative position where said fulcrum leg members are in engagement with the ground and acting as a fulcrum, whereby when force is applied to the handles (16) to swing said front loading end (24) of said body (12) to shovel up a load, the fulcrum leg members cooperate to assist in levering up a load of material.
2. A wheelbarrow (10) as claimed in claim 1, further characterised by:
a second link member (56) pivotally connecting between said fulcrum leg member (36) and said first link member (42); and
a cross bar (54) transversely extending behind said body (12) and underneath said handles (16), each end of said cross bar (54) being secured to said first link member (42) at each opposite side of said body (12);
whereby pushing said cross bar (54) towards the front loading end (24) drives said fulcrum mechanism (36) from said retracted position to said operative position.
3. A wheelbarrow (10) as claimed in claim 2, further characterised by a spring (62) is operatively arranged between each handle (16) and each pivotally connecting first link member (42), said springs providing the spring bias for said fulcrum mechanism.

4. A wheelbarrow (10) as claimed in claim 2, further characterised by each of said first link members (42) comprises a first portion (50) pivotally connected to said second link member (56), a second portion pivotally connected to said handle, and a third portion (48) secured to said cross bar.
5. A wheelbarrow (10) as claimed in claim 2, further characterised by a stop plate (40) is provided on each fulcrum leg member (36) at the free end thereof for limiting the penetration of the free end of each fulcrum leg member into the ground, said stop plate (40) being substantially perpendicular to a longitudinal axis of said fulcrum leg member.
6. A wheelbarrow (10) as claimed in claim 2, further characterised by the free end (38) of each fulcrum leg member (36) is tapered.
7. A wheelbarrow as claimed in claim 2, further characterised by the front loading end (24) of said body comprises a blade portion (28).
8. A wheelbarrow (10) as claimed in claim 7, further characterised by each opposite sidewall (20) at the front loading end (24) of said body has a height tapering (30) towards said blade portion.
9. CANCELLED
10. A wheelbarrow (10) as claimed in claim 1, further characterised by said wheelbarrow comprises two wheels (14) each being rotatably mounted on an axle (32) on each side wall of said body (12), said wheels (14) being mounted intermediate said sloping shovel end (24) and said rear end (26) of said body.
11. A wheelbarrow (10) as claimed in claim 2, further characterised by said first link member (42) is triangular (42) in shape.

12. A self-loading type wheelbarrow configured to be operable by one operator of the type having a body portion (12) for carrying a load, wheels (14) and handles (16) for pushing the body and characterised by:

a wheeled body (12), said body being generally in the shape of a sloping shovel having two opposite side walls (20), a front loading end (20) and a rear receptacle end (26); a fulcrum mechanism (36), (42), (54), (56) pivotally connected to said wheelbarrow and moveable from a retracted position where said fulcrum mechanism is clearing the ground and an operative position where said fulcrum mechanism is in engagement with the ground and acting as a fulcrum while force is being applied to the handles to swing said front loading end of said body to shovel up a load; wherein said fulcrum mechanism comprises:

a fulcrum leg member (36) pivotally connected to each side wall (20) of said body (12) at the front loading end thereof, a free end (38) of said fulcrum leg member being configured to engage to the ground;

a first link member (42) pivotally connected at the rear receptacle end of said body;

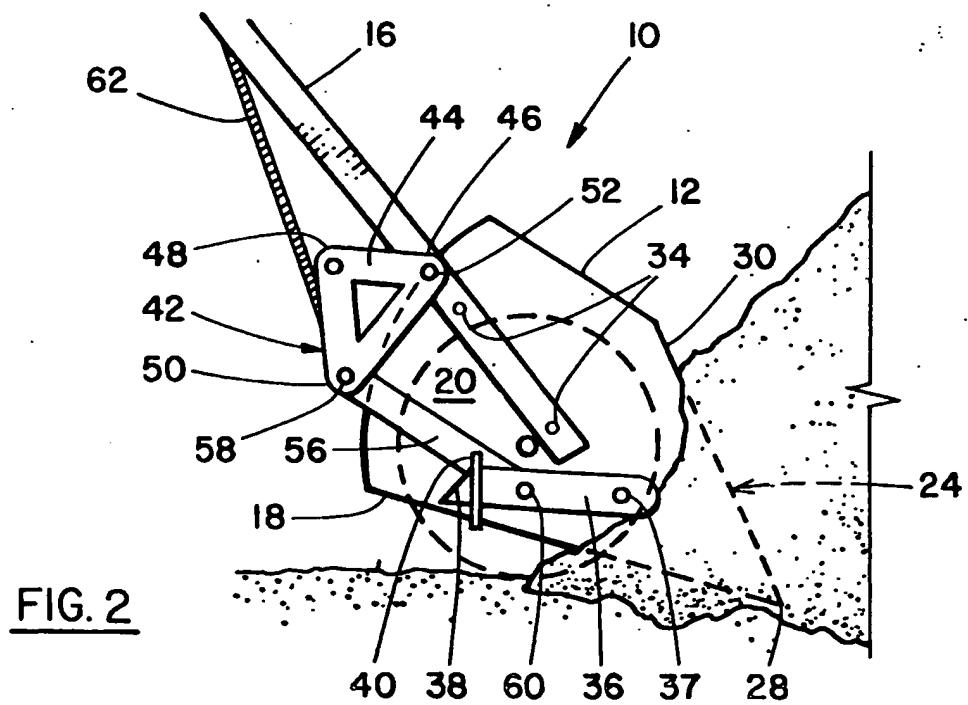
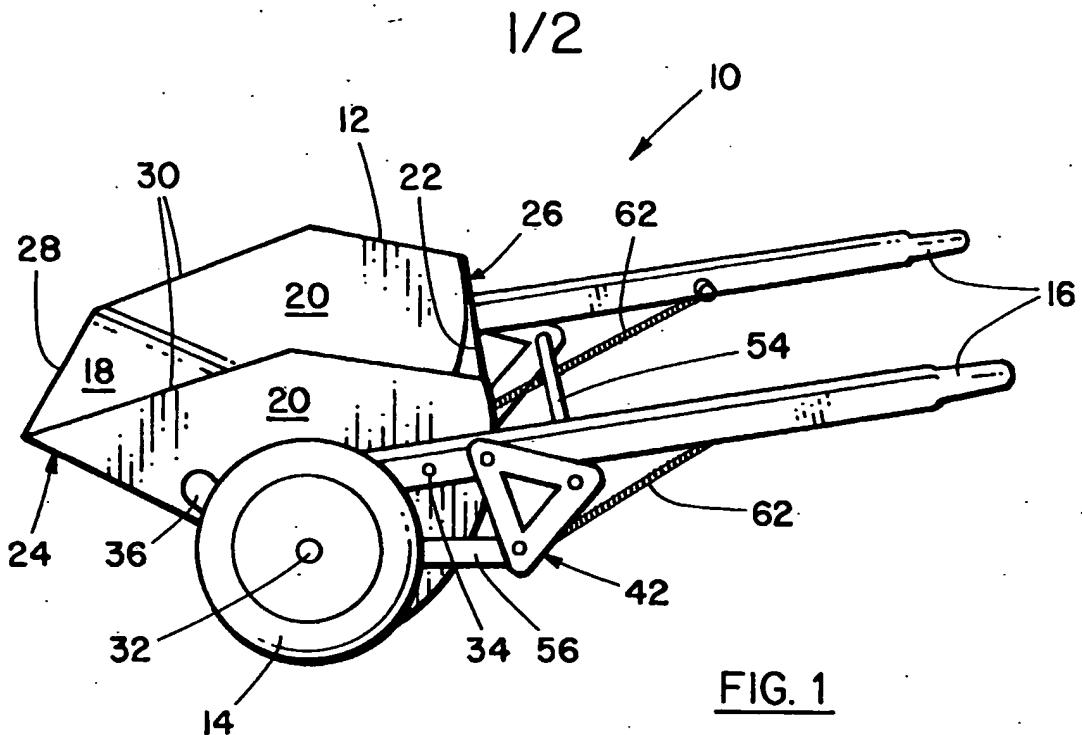
a second link member pivotally connecting between said fulcrum leg member (36) and said first link member (42); and

a cross bar (54) transversely extending behind said body and underneath said handles (16), each end of said cross bar being secured to said first link member (36) at each opposite side of said body;

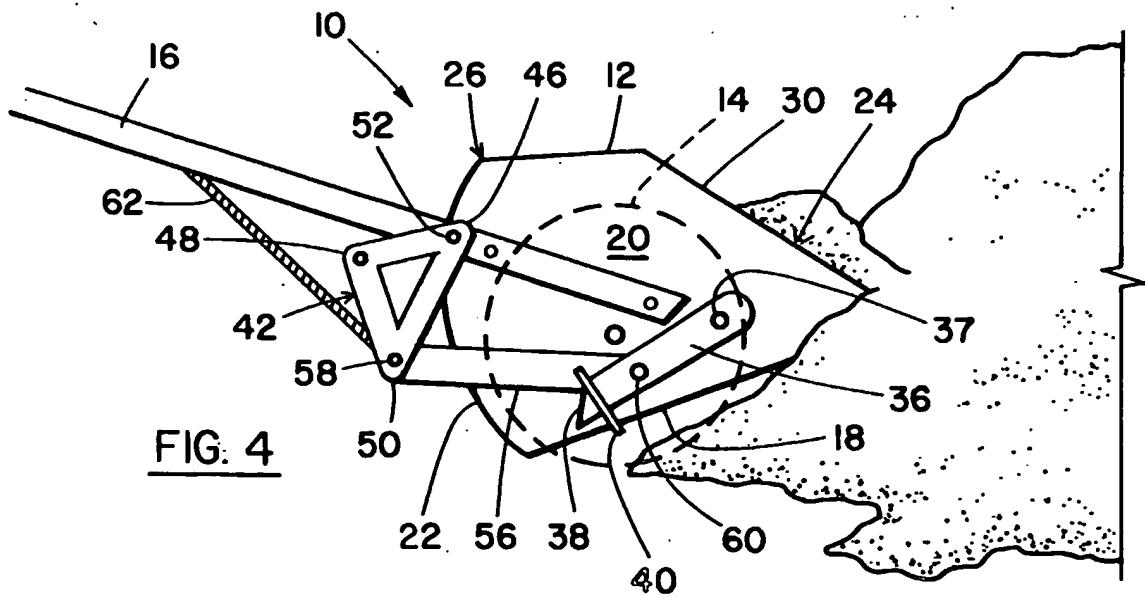
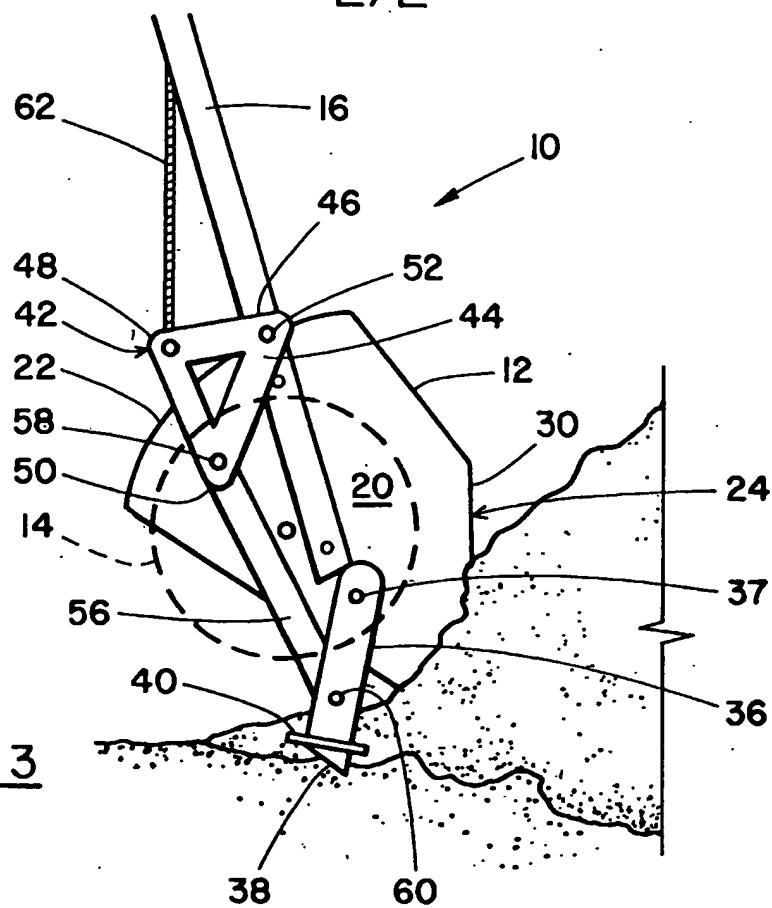
whereby pushing said cross bar (54) towards the front loading end by a foot of the operator drives said fulcrum mechanism (36) from said retracted position to said operative position.

13. A self-loading type wheelbarrow as claimed in claim 12, further characterised by a spring (62) is operatively arranged between each handle and each pivotally connecting first link member (42), said springs providing the spring (62) bias for said fulcrum mechanism.

14. A self-loading type wheelbarrow as claimed in claim 12, further characterised by each of said first link members (42) comprises a first portion (50) pivotally connected to said second link member (56), a second portion (52) pivotally connected to said body, and a third portion (48) secured to said cross bar.
15. A self-loading type wheelbarrow as claimed in claim 12, further characterised by a stop plate (40) is provided on each fulcrum leg member (36) at the free end (38) thereof for limiting the penetration of the free end of each fulcrum leg member into the ground, said stop plate being substantially perpendicular to a longitudinal axis of said fulcrum leg member.
16. A self loading type wheelbarrow as claimed in claim 12 further characterised by said springs (62) urge said fulcrum leg members (36) into a rearward position, and thus assist in forcing the sloping shovel body (24) forwardly into a load.



2/2



INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001464

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7] : B62B 1/22, B62B 1/18, B62B 5/00

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC [7] : B62B USPC: 280/47.12, 280/47.13; and others in 280 CPC: 280/88, /87, /79, /6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base, and, where practicable, search terms used)
Delphion CPD EPOQUE USPTO Keywords: wheelbarrow, loading, selfloading

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2289024 A (MILLS, P.G.) 1995.11.08 Whole document	1,9
X	US 1804403 (DOWLING, F.J.) 1931.05.12 Whole document	1
A	GB 2315048 A (KEMPSSELL, D.M.K. et al.) 1998.01.21 Abstract & Fig. 7 and 8	
A	US 4921305 (STEER, C.A.) 1990.05.01 Abstract & Fig. 1-3	
A	US 3043033 (INGRAM, H.O. et al.) 1962.07.10 Whole document	

Further documents are listed in the continuation of Box C.

Patent family members are listed in annex.

- * Special categories of cited documents :
 - "A" document defining the general state of the art which is not considered to be of particular relevance
 - "E" earlier application or patent but published on or after the international filing date
 - "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 - "O" document referring to an oral disclosure, use, exhibition or other means
 - "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international-type search 2 November 2004	Date of mailing of the international-type search report 26 November 2004 (26-11-2004)
Name and mailing address of the ISA/ <i>Commissioner of Patents</i> Canadian Patent Office - PCT Ottawa/Gatineau K1A 0C9 Facsimile No. 1-819-953-9358	Authorized officer Yvan Guay (819) 997-6578

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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